

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method of operating a cache in a digital computer system, the cache having a plurality of memory locations, the digital computer system comprising digital computer system memory with an address space separate from addresses of the plurality of memory locations in the cache, and the method comprising:

a) accessing a new item at an address in the address space of the computer system memory;

b) selectively storing ~~[[a]] the new item in the cache, the new item having an address in the address space associated therewith,~~ the selectively storing comprising:

i) associating a priority with the new item based on the address in the address space associated with the item;

ii) selecting a memory location in the cache based in part on priority indicators of the plurality of memory locations in the cache relative to the priority of the new item; and

iii) storing the new item in the selected memory location; and

~~[[b]]c)~~ associating the priority ~~associated with~~ of the new item with the selected memory location in the cache.

2. (Currently amended) The method of operating a cache as in claim 1 wherein selecting a memory location in the cache based in part on the priority indicators comprises:

a) when the cache has an empty memory location suitable for storing the new item, ~~storing the new item in an~~ selecting the empty memory location; and

b) when the cache has no empty memory location suitable for storing the new item, ~~storing the new item in~~ selecting the least frequently used memory location with a priority indicator that is the same or lower than the new item, if one exists, otherwise not storing the new item in the cache and treating the new item as not cacheable.

3. (Currently amended) The method of operating a cache as in claim 1 wherein selecting a memory location in the cache based in part on the priority indicators comprises ~~storing the new item~~

~~in~~ selecting the least frequently used memory location with a priority indicator that is the same or lower than the new item, if one exists.

4. (Currently amended) The method of operating a cache as in claim 3 wherein selecting a memory location in the cache based in part on the priority indicators comprises:

a) when the cache has an empty memory location suitable for storing the new item, ~~storing the new item in an~~ selecting the empty memory location; and

b) when the cache has no empty memory location suitable for storing the new item, ~~storing the new item in~~ selecting the least frequently used memory location with a priority indicator that is lower than the new item.

5. (Currently amended) The method of operating a cache as in claim 1 wherein selecting a memory location in the cache based in part on the priority indicators comprises:

a) when the cache has an empty memory location suitable for storing the new item, ~~storing the new item in an~~ selecting the empty memory location; and

b) when the cache has no empty memory location suitable for storing the new item and there is no least recently used memory location with a priority indicator that is the same or lower than the new item, not storing the new item and treating the new item as not cacheable.

6. (Currently amended) The method of operating a cache as in claim 1 wherein selecting a memory location in the cache based in part on the priority indicators comprises: ~~storing the new item in~~ selecting the least recently used memory location with a priority indicator that is the same or lower than the new item, if one exists.

7. (Currently amended) The method of operating a cache as in claim 6 wherein selecting a memory location in the cache based in part on the priority indicators comprises: ~~storing the new item in~~ selecting the least recently used memory location with a priority indicator that is lower than the new item, if one exists.

8. (Currently amended) The method of operating a cache as in claim 1 wherein selecting a memory location in the cache based in part on the priority indicators comprises: ~~storing the new item in~~ selecting the least recently loaded memory location with a priority indicator that is the same or lower than the new item, if one exists.

9. (Currently amended) The method of operating a cache as in claim 8 wherein selecting a memory location in the cache based in part on the priority indicators comprises: ~~storing the new item in~~ selecting the least recently loaded memory location with a priority indicator that is lower than the new item, if one exists.

10. (Currently amended) The method of operating a cache as in claim 1 wherein selecting a memory location in the cache based in part on the priority indicators comprises: ~~storing the new item in a pseudo randomly selected~~ selecting a memory location with a priority indicator that is the same or lower than the new item, if one exists.

11. (Currently amended) The method of operating a cache as in claim 10 wherein selecting a memory location in the cache based in part on the priority indicators comprises: ~~storing the new item in a pseudo randomly selected~~ selecting a memory location with a priority indicator that is lower than the new item, if one exists.

12. (Original) The method of operating a cache as in claim 1 wherein the cache contains a data array and a tag array and associating a priority indicator with a memory location comprises storing a value in a field in the tag array.

13. (Previously Presented) The method of operating a cache as in claim 1 wherein the digital computer system executes a plurality of processes, each process having a priority associated therewith and the priority associated with the new item is derived from the priority of the process that generated the new item.

14. (Original) The method of operating a cache as in claim 1 additionally comprising:

- a) assigning a first priority to a first portion of the plurality of memory locations;
- b) assigning a second priority, lower than the first priority, to a second portion of the plurality of memory locations;
- c) generating new items to store in the cache with priorities lower than or equal to the second priority; and
- d) using the first portion of the plurality of memory locations for non-cache memory operations.

15. (Previously Presented) The method of operating a cache as in claim 14 wherein the digital computer system comprises a digital signal processor and using the first portion of the plurality of memory locations for non-cache operations comprises using the first plurality of memory locations for digital signal processing operations.

16. (Original) The method of claim 14 wherein assigning a first priority to a first portion of the plurality of memory locations comprises writing to a control register.

17. (Currently amended) The method of claim 1 wherein associating a priority with a new item comprises reading a priority from a table associating priorities with memory addresses in the computer system memory.

18. (Original) The method of claim 1 additionally comprising altering the priority associated with a plurality of memory locations in the cache by writing to a control register.

19. - 30. (Canceled)

31. (Currently amended) A method of operating a cache in a digital computer system, the cache having a plurality of memory locations, the digital computer system comprising digital computer system memory with an address space separate from addresses of the plurality of memory locations in the cache, and the method comprising:

- a) configuring a data table to identify a plurality of blocks of addresses in the address space of the computer system and a priority ~~associated with~~ for each of the plurality of blocks of memory;
- b) receiving an item having an address in the address space in the computer system memory ~~associated therewith~~;
- c) obtaining from the data table a priority ~~associated with~~ for a block of the plurality of blocks of addresses in the address space of the computer system memory containing the address ~~associated with~~ of the item;
- d) identifying a plurality of locations in the cache based on the address associated with the item, each of the identified locations having a priority associated therewith; and
- e) selectively storing the item in a location of the plurality of locations selected based on a relative priority of the priority obtained for the item and the priorities ~~associated with~~ of the plurality of locations.

32. (Currently amended) The method of claim 31, wherein selectively storing the item comprises storing the item when the priority obtained for the item is the same or higher than the priority ~~associated with each of at least one~~ of the plurality of locations.

33. (Previously Presented) The method of claim 32, wherein configuring a data table comprises configuring a cacheability protection look aside buffer by assigning priorities to blocks of the plurality of blocks based on processes executing on the digital computer system that access memory locations within each block.

34. (Currently amended) The method of claim 32, wherein selectively storing the item comprises selecting a location from a subset of the plurality of locations, the locations in the subset having a priority that is the same or less than the priority obtained for the item, and the location being selected according to a replacement policy.

35. (Previously Presented) The method of claim 34, wherein selecting the location from the subset comprises selecting the location according to a least recently used replacement policy.

36. (Previously Presented) The method of claim 34, wherein selecting the location from the subset comprises selecting the location according to a least recently loaded replacement policy.

37. (Previously Presented) The method of claim 32, wherein selectively storing the item comprises associating the obtained priority with the location.

38. (Previously Presented) The method of claim 37, further comprising retaining the association between the obtained priority and the location until the item is removed from the location.

39. (New) A method of operating a cache in a digital computer system, the cache having a plurality of memory locations, the digital computer system comprising digital computer system memory with an address space separate from addresses of the plurality of memory locations in the cache, and the method comprising:

- a) configuring a data table to identify a plurality of blocks of addresses in the address space of the computer system memory and a priority for each of the plurality of blocks of memory;
- b) receiving a new item having an address in the address space of the computer system memory;
- c) obtaining from the data table a priority for a block of the plurality of blocks of addresses in the address space of the computer system memory containing the address of the new item, the obtained priority being a priority of the new item;
- d) identifying a plurality of locations in the cache based on the address in the computer system memory of the new item, each of the identified locations storing a cached item having a priority obtained from the data table based on an address in the computer system memory associated with the cached item;
- e) comparing the obtained priority of the new item to the priorities of the plurality of locations in the cache to determine whether at least one of the plurality of locations has a priority relative to the priority of the new item that satisfies a priority-based policy for replacement; and
- f) selectively storing the item based on the results of the comparing, the selectively storing comprising:

when there is not at least one of the plurality of locations having a priority satisfying the priority-based policy, not caching the new item;

when one of the plurality of locations has a priority satisfying the priority-based policy, storing the new item in the one cache location and recording the priority of the new item as the priority of the cache location; and

when at least two locations of the plurality of locations have priorities satisfying the priority-based policy, selecting in accordance with a usage-based replacement policy a cache location from the at least two of the plurality of locations for storing the new item.

40. (New) The method of claim 39, wherein a cache location satisfies the priority-based policy for replacement when the priority of the new item is higher than the priority of the cache location.

41. (New) The method of claim 40, wherein configuring a data table comprises configuring a cacheability protection look aside buffer by assigning priorities to blocks of the plurality of blocks based on processes executing on the digital computer system that access memory locations within each block.

42. (New) The method of claim 41, wherein the usage-based replacement policy comprises a least recently used replacement policy.